Roll No. | | | | | | | | | | | | | **Total No. of Pages: 01**

Total No. of Questions: 08

M.Tech. (ECE) (Sem. – 2)

MIMO SYSTEMS

Subject Code: MTEC-PE4B-18

M Code: 76266

Date of Examination : 19-12-2022

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWELVE marks.**

1. How diversity at transmitter is helpful in improving the performance of wireless communication system? Explain the working of rake receiver with proper mathematical expressions.

2. What are the various types of MIMO systems? What are the advantages and challenges of MIMO (multipleinput multipleoutput) systems over SISO (single input single output) systems?

3. What is space time coding? Explain, how it improves diversity gain? What is the difference between space time and space frequency codes?

4. With the help of vector calculus, define singular value decomposition, Eigen values and Eigenvectors? Explain how these concepts are used in solving the generic problem of MIMO system.

5. What are the disadvantages of pre-distortion in MIMO systems? What is combining in MIMO systems? What are its advantages and disadvantages?

6. Explain the principle of beamforming in MIMO system. How does it help in increasing spectrum efficiency? Differentiate between switched and adaptive beam-former.

7. Define Doppler spread and coherence time of multipath propagation channel. Differentiate between slow and fast fading on the basis of Doppler spread.

8. **Write short notes on:**

   a) MIMO in LTE

   b) Training based and blind channel estimation techniques.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.